

ATOMIC ENERGY

newsletter.

THE FIRST AND ONLY ATOMIC NEWS SERVICE

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Dear Sir:

An experimental nuclear detonation was set off last week in the Monte Bello Islands, 85-miles northwest of Australia, by a British group under the direction of Dr. W. G. Penney, chief superintendent of armament research, British Ministry of Supply. This was the first such detonation by Great Britain, and makes her the third nation in the world to have acquired the ability to construct an atomic bomb. Technical recordings and other data are now being assembled, to conduct the post-explosion analysis which will show the characteristics of the explosion.

The German Federal Republic will be permitted to mine uranium and construct its own nuclear reactor as soon as its pending treaties with the Western powers have been ratified, according to Dr. Werner Heisenberg. Dr. Heisenberg, who is considered Germany's leading nuclear physicist, said in Berlin last week that the activities would be limited to non-military fields. Hitherto, such activities were banned by the Four-Power Agreement (Britain, France, Soviet Union, and United States) of Nov. 12, 1946.

The largest uranium refining mill in the United States went into operation last week at Uravan, Colo., when U. S. Vanadium Corp. (subsidiary of Union Carbide & Carbon) commenced work using a new method of handling uranium and vanadium ores. This process which it is using is believed to be the most efficient yet developed for the recovery of both uranium and vanadium when they occur in high lime content ores.

Marking the increasing interest of private industry in nuclear energy development, complete instrumentation for controlling nuclear reactors is now being offered by Radiation Counter Laboratories, Skokie, Ill. It is believed that this is the first such firm to offer, through its regular catalog, complete instrumentation of this nature.

Electric Energy, Inc., Joppa, Ill., the facility, organized by several electric utilities for the express purpose of furnishing electrical energy to the Paducah, Ky., uranium-235 producer plant (now being constructed) will shortly receive its first generator. General Electric, the firm making four generators for the Joppa plant, said the turbine generator, with a maximum output of 216,000 KW, is the largest of its type ever built.

In a report made to the USAEC by its General Advisory Committee (Oliver E. Buckley, James B. Conant, Lee A. DuBridge, Willard F. Libby, Eger V. Murphree, I. I. Rabi, and J. R. Oppenheimer, Chairman), the Committee points out that in its 5½ years of operation, it has given the Commission its opinion on various subjects. Among these subjects were the objectives of the thermonuclear program; the technical benefits to be derived from collaboration with the United Kingdom and Canada; the organization of the Commission's development work on nuclear reactors and its efforts in the field of raw materials; the needs for weapon tests; and the relation between the problem of custody of atomic weapons and the combat readiness of such weapons.

NEW PRODUCTS, PROCESSES, & INSTRUMENTS... for nuclear work...

Pulse generator, Model 47, Mark 15, is said to have an extremely short rise time pulse with precise control of pulse amplitude. This Model 47 Pulser, the manufacturer states, is of particular value in testing linear amplifiers and pulse circuits where a low level signal is required. The pulse fall time is stated to be 350-microseconds. The instrument has ranges of 1-millivolt, 3-millivolt, 10-millivolt, 30-millivolt, and 100-millivolt pulse amplitude with 10-turn linear potentiometer control over these ranges. The pulse height is standardized against a standard cell in the instrument. Repetition rate is 3600-pulses per second. The instrument is said to be similar to Oak Ridge National Laboratory model Q-1066.--Radiation Counter Laboratories, Skokie, Ill.

Sensitive gamma ray Geiger tube, constructed of metal, is said by the manufacturer to be six times more sensitive to gamma radiation from radioactive iodine than other tubes of similar dimensions. The tube contains a bismuth cathode, and has a standard four-prong connector. Overall length is 8-inches; diameter is 1-inch. --Nucleonic Company of America, 497 Union St., Brooklyn, 31, N. Y.

NOTES: The synthesis of ring labeled cholestenone at double previous specific activity, and four times the specific activity of similarly labeled steroids, is now announced by Radioactive Products, Inc., Detroit, Mich., manufacturers of radiation instruments and radiochemicals. This new Cholestenone 4-C 14 has a specific activity of 10-microcuries per milligram. It is being supplied by Radioactive Products from stock in minimum quantities of 10-microcuries.

Halogen filled Geiger tubes, manufactured by Amperex Electric Corp., Brooklyn, N.Y., are now being distributed by Tracerlab, Inc., Boston, Mass. Tracerlab will carry in stock Amperex types 100NB and 200NB mica window radioassay counters, type 90NB small metal beta-gamma counter, and type 150N small mica window counter.

The Naval Medical Research Laboratory showed publicly in Washington last fortnight a remote-control device which handles containers of radiocobalt in pneumatic tubes. This method of handling makes it possible to irradiate the entire body of a laboratory animal in a uniform manner, and the Navy has claimed that in this instrument it has a handy as well as inexpensive radiation device.

Tritiated stilbene, which yields almost constant luminosity, has been produced on an experimental basis by Tracerlab, Inc., Boston, Mass. It is produced by incorporating a quantity of radioactive tritium into stilbene, and processing the compound to form a solid crystal. The stilbene fluoresces from the tritium's beta ray emanation. Dr. Irving A. Berstein, and Earle Farmer, of Tracerlab, who developed the process, point out that although light from the tritiated stilbene is visible to the naked eye, the maximum light output is strongest in the region where the eye is least sensitive, and where all phototubes are most sensitive. They feel, therefore, that the new source may be useful for calibrating instruments containing phototubes, which must be standardized periodically, since the source yields almost constant luminosity, and has essentially no health hazard. It may also be of use, they feel, to astronomers and other scientists who need a constant light source for optical research. The brightness diminishes at the rate of only about 5% each year. It is expected that the tritiated stilbene crystals will retain over 50% of their light output even after 10-years of use. This contrasts with radium-activated sources which lose half their light in about three to six months. Work is now in progress, at Tracerlab, on the preparation of other non-hazardous, self-luminescent materials which will be far more visible to the human eye. These materials, according to Dr. Bernstein, should be useful for luminous markers, watch dials, and the many other applications for which the radium-activated substances are now commonly used.

Nuclear Research & Development, Inc., St. Louis, nuclear physics consultants, have received a \$30,000 loan from the RFC, under the Defense Production Act, the RFC recently announced in Washington. The loan is for new equipment and working capital.

A new catalog of nuclear instruments, accessories, and services is now available from Nucleonic Company of America, Brooklyn 31, N.Y. Included are this manufacturer's basic radiation laboratory instruments; survey instruments and replacement parts; sample handling equipment; special electronics devices; and other apparatus.

RAW MATERIALS...radioactive minerals for nuclear energy work...

UNITED STATES: Moab, Utah- Pitchblende has been reportedly discovered in the Big Indian mining district, 9-miles south of La Sal, San Juan county by Charles A. Steen, field geologist of Cisco. Steen stated in the last fortnight that he found the pitchblende in the first diamond core drill hole drilled by him on the Linda Mujer group of claims which he staked in 1951. The pitchblende, he said, was found at a depth of 73-feet, and assays of the core indicate 8-feet of 0.34% uranium oxide, and 6-inches of core that is better than 2% uranium oxide.

Denver, Colo.- The present jeopardy of the rights of uranium miners to develop uranium ore deposits in areas embraced by Federal oil and gas leases may soon be ended, according to Frank H. MacPherson, Manager, Colorado Raw Materials Office, USAEC. The difficulty has been caused by decisions of the Department of Interior which have uniformly held that a valid mineral claim cannot be staked on land covered by a pre-existing lease issued under the Mineral Leasing Act of 1920. (The Act permitted Government leasing of public domain lands for extraction of non-metallic minerals, such as oil and gas. Since metallic and non-metallic minerals were seldom found in the same place, no difficulty was experienced until uranium mining commenced. Now that uranium minerals are in many instances found in the areas covered by oil and gas leases, it has become necessary to obtain relief for the uranium miners operating in such areas.) The USAEC expects to clarify the rights of the uranium miners by use of its authority under the Atomic Energy Act of 1946, as no relief appears possible under an interpretation of the mining laws.

CANADA: What company officials state is high grade pitchblende has now been encountered in both of the underground programs of Nesbitt-LaBine Uranium Mines. Assays made on the company's Eagle Ace group showed 4.61% uranium oxide for 3-feet intersected by one underground drill hole some 70-feet from the main heading. The other location is on the firm's ABC group, where pitchblende described as comparable to the high grade surface exposure was tapped shortly after the crosscut entered the main fault zone. This occurrence was said to be in ribbons of massive pitchblende extending across the drift face.There is an indication of a large uranium orebody on the property of Gunnar Gold Mines, at St. Mary's Channel, on Lake Athabasca, according to president Gilbert A. LaBine. He said that while insufficient work has been done to permit a grade estimate, something between 0.1% and 0.15% is visualized.

The optimism engendered by the Gunnar and Nesbitt-LaBine announcements, as above, was reflected by their activity on the Toronto Stock Exchange. Following these announcements, Gunnar reached a high of \$2, from a low that week of \$1.55, closing at \$1.92. Nesbitt-LaBine went to \$3.60, from a low that week of \$2.50, closing at \$3.20. Chimo Gold, another property tying on to Gunnar, also reached a high point. As a result, trading showed an 18-year high for Gunnar, a 6-year high for Chimo, and a new high for the relatively newcomer Nesbitt-LaBine.

NEW BOOKS & OTHER PUBLICATIONS...in the nuclear energy field...

Geiger Counting Technique of X-ray Diffraction, Part II: Method of Determining Thicknesses of Thin Coatings, by H. Friedman and L.S. Birks, Naval Research Laboratory, Washington. Covers work done in 1944. No. PB-107204....Effects of Ionizing Radiation Upon Physical and Psychological Capacities in Various Species, Part I: Efficiency of the Serial Multiple Visual Discrimination Apparatus and Method With White Rats, by P.E. Fields, USAF, School of Aviation Med., Texas. No. PB-107154....Above two reports obtainable from Library of Congress, Photoduplication Sect., Wash. 25, D.C., no. 107204 at \$1.25 for the microfilm or photostat; no. 107154 at \$1.75 for the microfilm or \$2.50 for the photostat.

Cobalt-60 Teletherapy Unit: Output, Depth Dose, and Isodose Distributions, by W. Dixon, C. Garrett, and A. Morrison, National Research Council of Canada, Physics Div.--National Research Council of Canada, Ottawa, Ontario, Canada. (75¢)

Geologic Guides to Prospecting for Carnotite Deposits on the Colorado Plateau. Based on a statistical study of the geologic logs of about 2,500 holes drilled. -- Superintendent of Documents, Washington 25, D.C. (15¢)

PRESENT AND FUTURE ACTIVITIES OF THE U. S. ATOMIC ENERGY COMMISSION AS THEY AFFECT MINING. A special digest, prepared for readers of this NEWSLETTER, of a talk by USAEC Commissioner Henry D. Smyth, before the American Mining Congress, Denver, Colo., Sept. 25th, 1952

Only ten years have passed since the first self-propagating nuclear chain reaction was achieved at Chicago on December 2nd, 1942.

Now, ten years later, this country has a multi-billion dollar industry based on atomic energy.

As you know, the reason we have a multi-billion dollar atomic energy industry today has little to do with the normal peacetime growth of a new technology. Our plants exist because they can produce a very concentrated and powerful explosive at relatively low cost.

Since 1945, the Commission laboratory at Los Alamos, New Mexico, has made great advances in weapon design so that we can now use fissionable material much more efficiently than in 1945 and can make a variety of atomic weapons to meet varying needs. At the same time, the Department of Defense has had time to explore the most effective way of using the weapons we make for them, and consequently has enlarged its requirements. These two developments, coupled with the increasing international tension, have lead the Congress to authorize two major expansions in our plant facilities.

Plants at Savannah River, South Carolina, and at Paducah, Ky., are the biggest items in the first of these expansions. The construction of these plants is well under way. The more recent expansion, authorized by Congress last Summer, will cost about \$3 billion. It will give us an entirely new plant at Portsmouth, Ohio, and enlargements of several of our older plants. When this expansion is finished, our capital investment in plant facilities will be nearly \$10 billion.

Obviously, we cannot run all these new plants without increasing our supply of raw materials. To make more atomic weapons, we must have more uranium ore. And, thanks to the mining fraternity, we are getting it.

As you know, the original sources of uranium and radium were principally the Colorado Plateau and the Joachimsthal in Czechoslovakia. Before World War II, both of these sources had been outdone by new mines in the Belgian Congo and in Northern Canada. In the past five years, the USAEC has made intensive searches for new sources of supply. Probably the most striking success in terms of percentage increase of yield has been on the Colorado Plateau. More mines and mills have been opened there. We are counting on a continuing flow of ore from this region although the Belgian Congo mines, and Eldorado at Great Bear Lake in Canada, continue to be major suppliers. We also have high hopes for the new mines in Northern Saskatchewan, and in Australia. Within a few months we will begin to get uranium as a by-product from the South African gold mines. A similar source, on a smaller scale, is uranium as a by-product of the phosphate industry.

These two sources--the gold ores, and the phosphates--illustrate the importance of research in processing. We have known for some time that there was a little uranium in these materials, but it has taken time to develop methods of getting it out. We know of other low-grade sources, but so far the estimated cost of extracting uranium from them is beyond all reason.

Now you naturally ask how long we are going to continue to spend billions of dollars for atomic armament, and when can we use uranium as a source of peacetime power. You also want to know how long the need for uranium ore will persist, either for armament or power purposes. Unfortunately, no one knows the answers to these questions. All we can do is to make guesses on the basis of such facts as we have.

The estimate of possible demand for uranium for civilian power is also a guess, depending as it does on unsolved technical and economic problems, to say nothing of sociological and political problems.

It is my own belief that the use of uranium for power purposes will become economically feasible before the need of uranium for military purposes begins to slack off. Therefore, I believe there is going to be a continuing demand for uranium ore.

ATOMIC ENERGY WORK ABROAD...

Great Britain: The possibilities of asking industry to take a part in atomic energy research are now being considered by the British government, recent hearings of the Select Committee on Estimates indicate. According to Sir John Cockcroft, head of the Atomic Energy Research Establishment, Harwell, and Lt. Gen. Sir Frederick Morgan, Controller of Atomic Energy, who appeared before the Committee, that field is about to be opened and explored. The Committee was told that two major reasons for the lack of industry participation to date have been preoccupation with armaments production and the lack of opportunity to make a profit. Sir Morgan stated that he saw no reason for industry to come in if it could not make a profit.

At Harwell, Sir John Cockcroft explained, about 40% of the effort was devoted to problems of production establishments, and about 60% to civil applications of atomic energy. One-third of Harwell's effort was said to be broadly research, and two-thirds development. Concerning the civil side of atomic energy, Sir John stated that the main application of the products of the uranium processing plants would be in the use of fissile material for the development of nuclear power. One of the projects it is now hoped to start (he said) is directed toward such a use, and at the same time would produce more fissile material.

Canada: Construction work on the new N.R.U. reactor has started, while the existing reactors at Chalk River have been in continuous operation, with the N.R.X. reactor at somewhat increased power states the sixth annual report of the Atomic Energy Control Board of Canada for the fiscal year ending Mar. 31, 1952, only now released.

Production of radioactive isotopes at the Chalk River project has continued to increase, the report points out. Nearly 1,000 shipments of over 70 different isotopes were made during the year, to such destinations as the United States, Great Britain, various countries in western Europe, South America, as well as to universities, hospitals and industries in Canada.

Exploration and development of uranium properties in Canada continue, the report states. While prospecting activity showed a slight decline, development was more than correspondingly accelerated,. This is particularly true of the Beaverlodge area, where it has been estimated that several million dollars will be spent in the coming year. Although much of this sum must be credited to expenditures by Eldorado Mining and Refining, a very considerable amount will be spent in private exploration, according to the report.

Of interest is the number of properties or occurrences showing uranium or thorium in amounts of 0.05% or more; some 556 such properties or occurrences have been reported and permits to carry on exploration and development work were issued and are in effect in 100 cases. Of these, 19 were issued in 1951.

The radioactivity division of the Department of Mines and Technical Surveys continued investigations on treatment of radioactive ores, with emphasis on development of new and improved methods for recovering uranium from Canadian ores. Two new leaching processes, one of which is ready for pilot plant testing, will be particularly suitable for treating granitic ores, and ores high in carbonate minerals, the report states.

Research was carried out during the year both at Chalk River and at various Canadian universities. Grants were made to six universities for basic research, and to two universities for research on treatment of uranium ores.

The financial statement of the fiscal year showed total receipts of \$13,841,349, of which \$12,310,714 were parliamentary appropriations. Expenditures for the year amounted to \$12,237,981 for the atomic energy project; \$200,000 for grants-in-aid; and \$34,483 for administration expenses.

Sincerely,

The Staff,
ATOMIC ENERGY NEWSLETTER